

REMARKS/ARGUMENTS

The response to the office action is set out at the end of the Remarks section.

In this Voluntary Amendment, a number of amendments are being made to the description, figures and claims of the application as filed. The Applicant submits that amendments to the description and the figures are minor and do not add any new matter. The amendments to the claims have been made to better recite the invention and also do not add new matter.

Amendments to the Description

A number of minor, clerical amendments are being made to the paragraphs of the specification listed above. It is submitted that, in each instance, the amendment being entered is of a minor, clerical nature, requiring no detailed comment, and all of these amendments are merely intended to ensure that the description is entirely consistent, clear and definite.

With respect to the amendment to paragraph [0009], the term "membrane exchange assembly" should have been "membrane electrode assembly". Further, the replacement of the term "current collectors" with the term "insulator plates" merely brings the language into agreement with the final sentence of this paragraph.

With respect to paragraph [0014], a clerical error was corrected since two sentences were incorrectly joined and the term "membrane exchange assembly" should have been "membrane electrode assembly".

With respect to paragraph [0016], the adjective "at least one" was added to correspond to an earlier instance of "at least one groove network".

With respect to paragraph [0033], the term "proton exchange member" should have been "proton exchange membrane".

With respect to the amendment to paragraph [0077], the amendments simply correct a reference numeral, corresponding with the reference numeral 131 used in the drawings to identify the tie rods. Also, this paragraph was amended to correctly describe the surfaces of the anode and cathode flow field plates which is supported by the corresponding figures.

With respect to the amendment to paragraph [0089], the amendments simply correct reference numerals and properly refer to the term "groove junction portion".

With respect to the amendment to paragraph [0110], the amendment simply is made to identify which Figure shows eight and ten transfer slots 180a.

With respect to the amendments to paragraph [0144], it is to be noted that the term "gas diffusion layer", otherwise known as the acronym GDL is sometimes used in this art. Solely for consistency with the earlier terminology, the acronym GDM, "gas diffusion medium" is being inserted.

With respect to the amendments to paragraphs [0149], [0152], and [0157], these simply correct the reference to the parts of one of the components to "3.8" from "38", and it can be noted that this is wholly consistent with the data given in the relevant tables, so that no new matter has been added.

Amendments to the Figures

With respect to the drawings, amendments are being made to Figures 1a-e, 2, 7-12, and 17. In Figures 1 and 2, the amendments to the lead lines are intended merely to ensure that these drawings are wholly consistent with the specification and to aid in understanding the drawings. In Figure 7, the connection apertures have been labeled

with reference numeral 160. In Figure 8, for consistency with Figure 7, the references 137, 139 and 141 now denote ports on the left hand side, while references 136, 138 and 140 denote ports on the right hand side. In Figure 9, the connection apertures have been labeled with reference numeral 160. In Figure 10, the reference numerals 182', 184' and 186' are, in effect, being switched with the reference numerals 182a', 184a' and 186a'. In Figure 11, at the right hand side reference numeral 160e has been amended to read 160ae and the reference 160e added on the left hand side; at the top 132 has been corrected to 192. These amendments are simply intended to ensure consistent use with the reference numerals used in the Figures and the description and for clarity in the drawings.

Amendments to the Claims

With respect to the claims, claims 1-10 have been cancelled without prejudice and have been replaced with new claims 11-20. Claims 11-20 correspond to claims 1-10 as originally filed with changes made to claims 11 and 17-20.

Claim 11 now recites a method of forming seals in an electrochemical cell assembly rather than a fuel cell assembly. Support for this amendment is in paragraphs 22, 31 and 116 of the application as filed.

Claims 17-20 now recite a "seal material" rather than a "composition" to comply with the terminology used in claim 11.

If the Examiner has any questions with regards to the amendments made herein, the Examiner is respectfully requested to contact the undersigned.

Response to Office Action of June 27, 2005

The sole issue raised in the office action is a rejection of claims 1-10 under the judicially created doctrine of obviousness-type double patenting, over claims 1 and 4-10 of US patent 6,761,991. This rejection is respectively traversed.

The Examiner's argue that "it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to inject the sealing material into the groove as an effective and well known means of placing the sealing material in the fuel cell plate". This is the principle argument made by the Examiner and is addressed below, but Applicant's reserve the right to address this rejection individually with respect to features of individual claims.

As detailed in MPEP 804 II B1, a double patenting objection of the obviousness-type is "analogous to a failure to meet the non-obviousness requirement of 35 U.S.C 103", and accordingly the factual inquiries set forth in *Graham vs. John Deere Co.* are to be applied. These factors are as follows:

- (a) determine the scope and content of a patent claim in the prior art relative to a claim in the application at issue;
- (b) determine the differences between the scope and the content of the patent claim and the prior art as determined in (a) and the claim in the application at issue;
- (c) determine the level of ordinary skill in the pertinent art; and
- (d) evaluate any objective in the sea of non-obviousness.

In the present case evaluation of step (a) and (b), as the Examiner acknowledges, the key difference is the absence in the '991 patent of any teaching or suggestion that the sealing material could be injected into a groove network to form seals. The '991 patent is noteworthy for only teaching the provision of a seal formed on a plate independently of other plates, and such a seal would require the use of a separate mold forming the rib profile chosen. With respect to step (c) the Examiner correctly notes at the foot of page 5 of the action, the "prior art is silent to injection (sic) a curable sealing material having a composition set forth in claim1".

If one considers the level of ordinary skill in the art and general level of knowledge in this art, common teachings are that, for example, to form a gasket there are two basic

options, namely: take a sheet of suitable resilient material and cut out a gasket of desired profile, this generally having the limitation that the gasket must have a uniform thickness, i.e. without any ribbed profiles or the like; or inject a moldable material into a completely enclosed mold to form a gasket having a desired profile, where the use of a mold enables desired rib features and the like to be incorporated. The teaching in the '991 patent is a variant of the second option, and reference can be made, for example, to column 9, lines 14-29. There it is stated that insert injection molding is a preferred technique for making unitary seal types of fuel cell plates. It is explained that a fuel cell plate containing an uncured sealing material is placed or inserted into one side of a mold cavity and brought into contact with the other side or half of the mold cavity. This then defines the shape of the seal and the sealing material can be cured. The mold halves are then separated and the finished fuel cell plate is removed from the mold.

While such a technique obviates the need to assemble separate plates and gaskets, there is still a considerable assembly required and still a need to ensure that a gasket formed on one plate is accurately aligned with an adjacent plate. Moreover, this does not deal with the problem of variations in tolerances. A seal molded on one plate and dimensions of an adjacent plate must be such as to ensure that an appropriate pressure is applied to the seal to give an adequate seal.

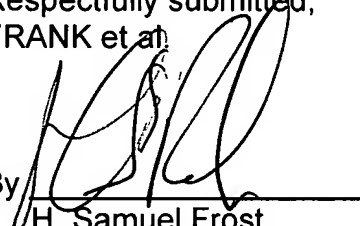
There is nothing in this teaching to suggest that the seal material can be injected into a completely enclosed groove network formed between plates within an electrochemical cell assembly, to form the necessary seals between adjacent plates. This technique has a number of advantages. It can greatly simplify the assembly of the individual plates, and often it may not be necessary to ensure that the plates are as accurately aligned as in the technique described above. Since the closed groove network will be filled with the seal material, the issue of dimensional tolerance is greatly relaxed; should any particular groove be slightly smaller or larger than originally intended, the seal material will still fill it and ensure that a complete seal is formed.

Accordingly, there is absolutely nothing in this art to teach or suggest to a notional skilled person that the seal can be formed by injection into a groove network between assembled plates of a cell stack. Rather, the express teaching in the '991 patent, and indeed the entire teaching in this art is exactly to the contrary; the teaching is that seals and gaskets are either made entirely independently, or at best are molded onto one side of a plate, with the plates being later assembled and with this technique permitting ready disassembly of the plates if required.

Accordingly, the Examiner's rejection of the claims under the obviousness-type double patenting doctrine is submitted to be incorrect and the Examiner is requested to withdraw this rejection.

Respectfully submitted,
FRANK et al

By



H. Samuel Frost
Reg. No. 31,696
Tel: 416-957-1687

Attachments

Amendments to the Figures:

The attached drawing sheets include changes to Figures 1a-e, 2, 7-12, and 17 and 11. These sheets, which include Figures 1a-e, 2, 7-12, and 17, replace the original sheets including Figures 1a-e, 2, 7-12, and 17.

Attachment at end of paper: Replacement Sheet
 Annotated Sheet Showing Changes



Annotated Sheet Showing Changes

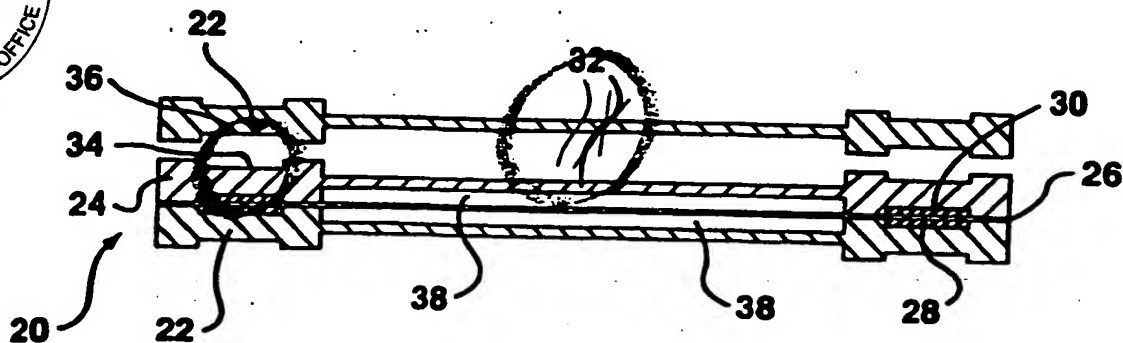


FIG. 1a

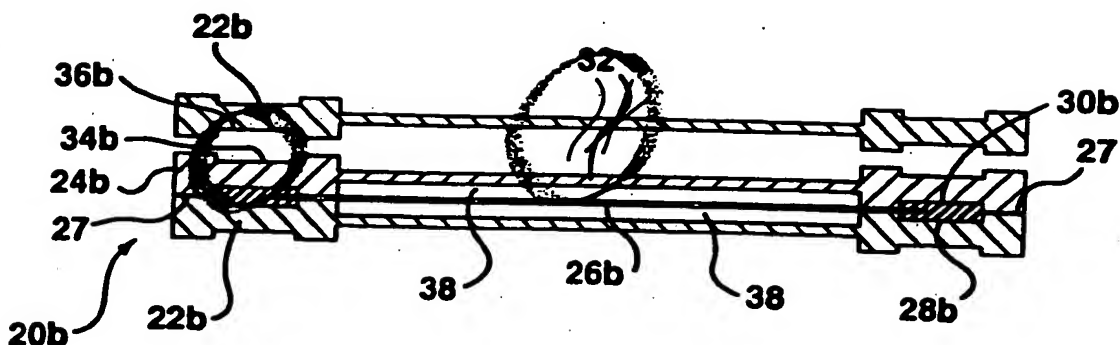


FIG. 1b

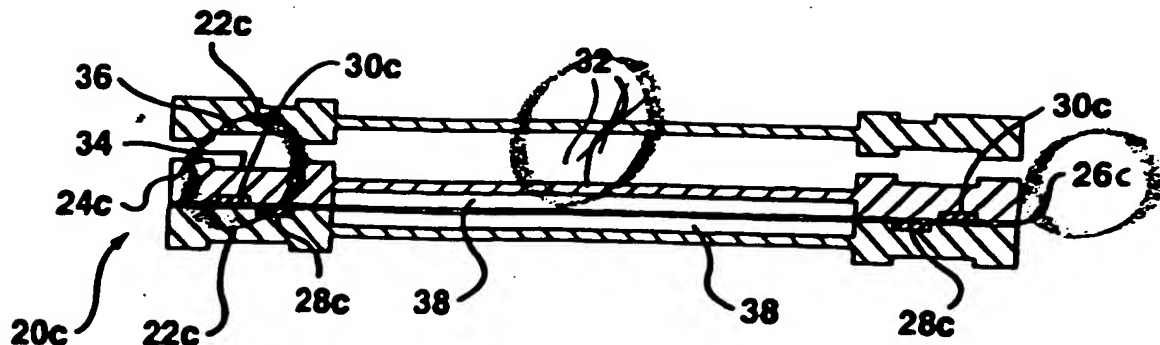


FIG. 1c

Annotated Sheet Showing Changes

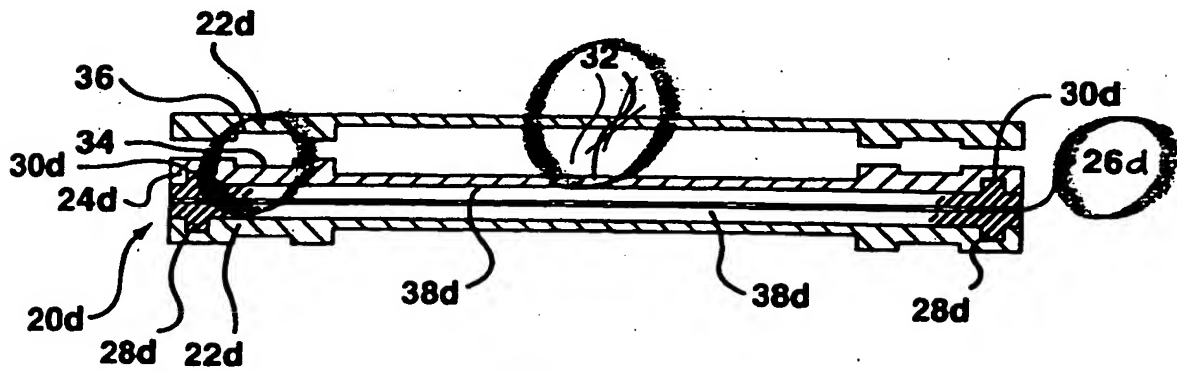


FIG. 1d

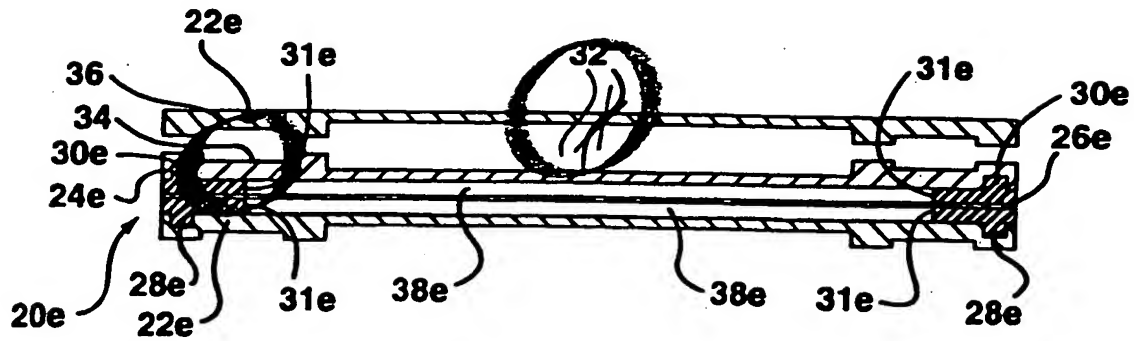
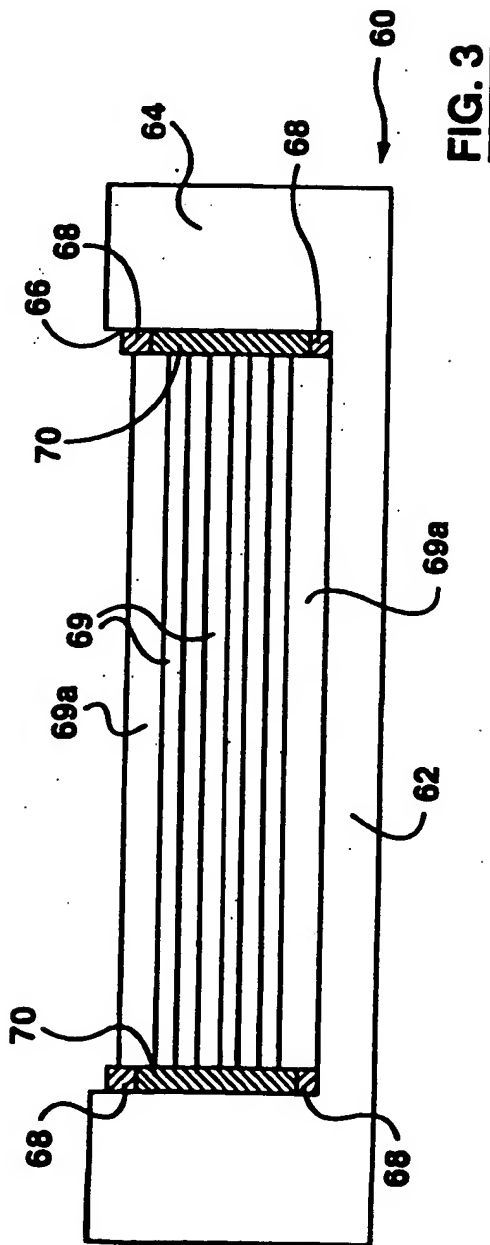
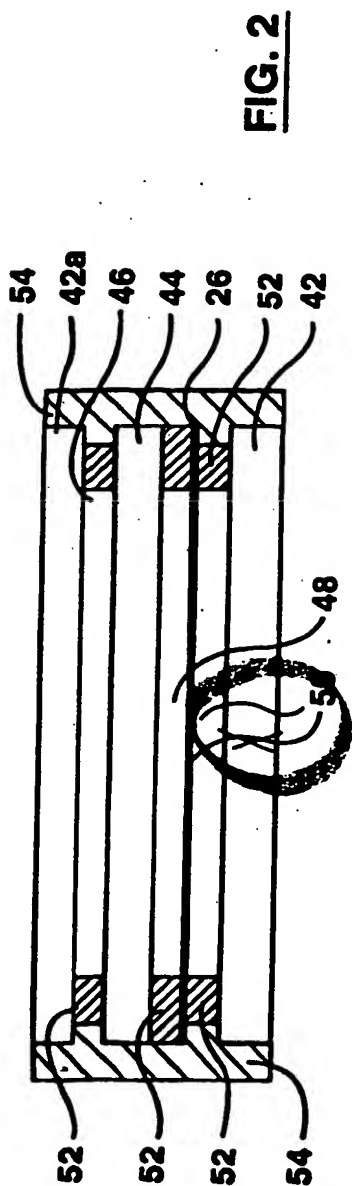


FIG. 1e

Annotated Sheet Showing Changes



Annotated Sheet Showing Changes

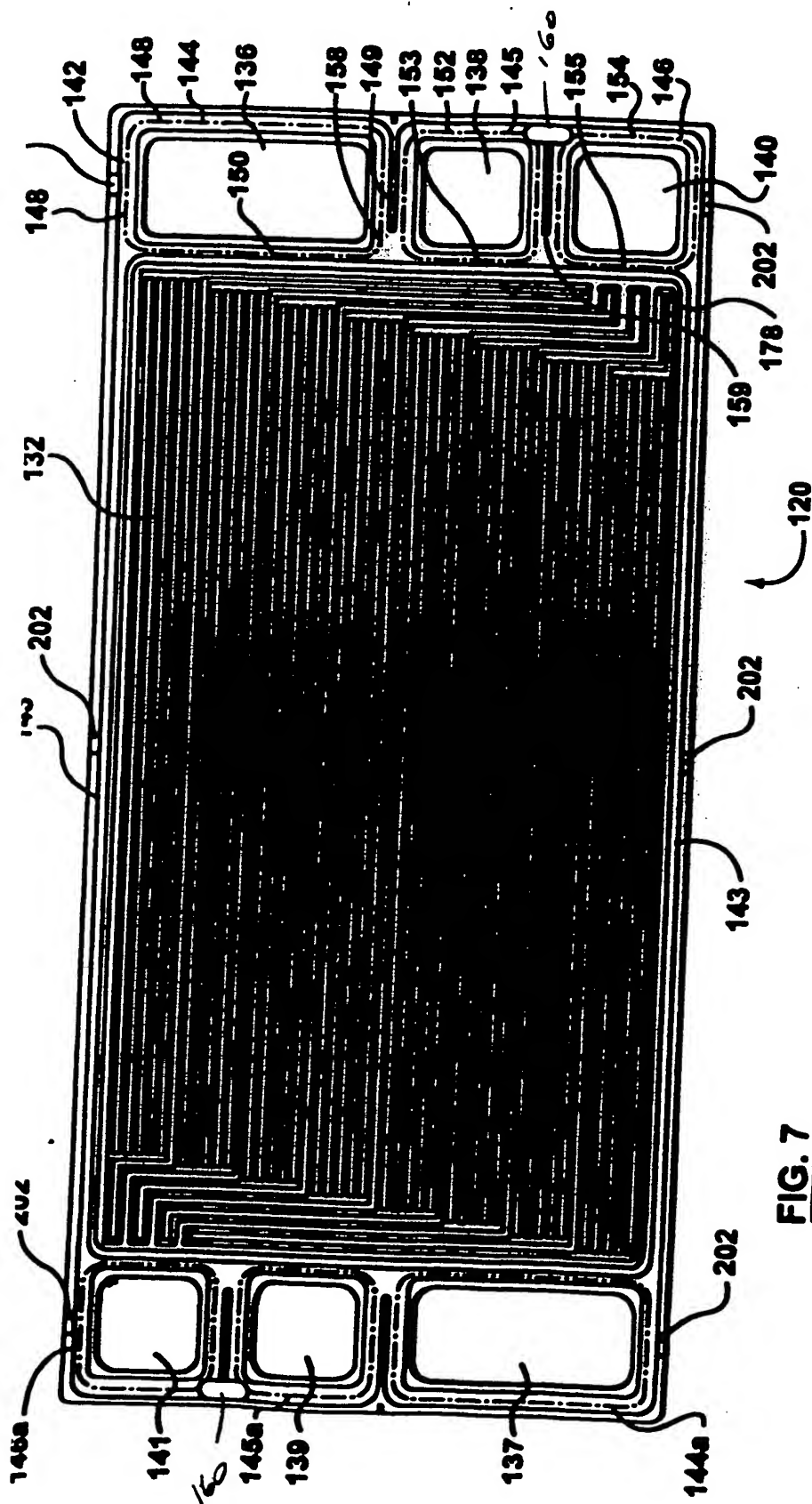
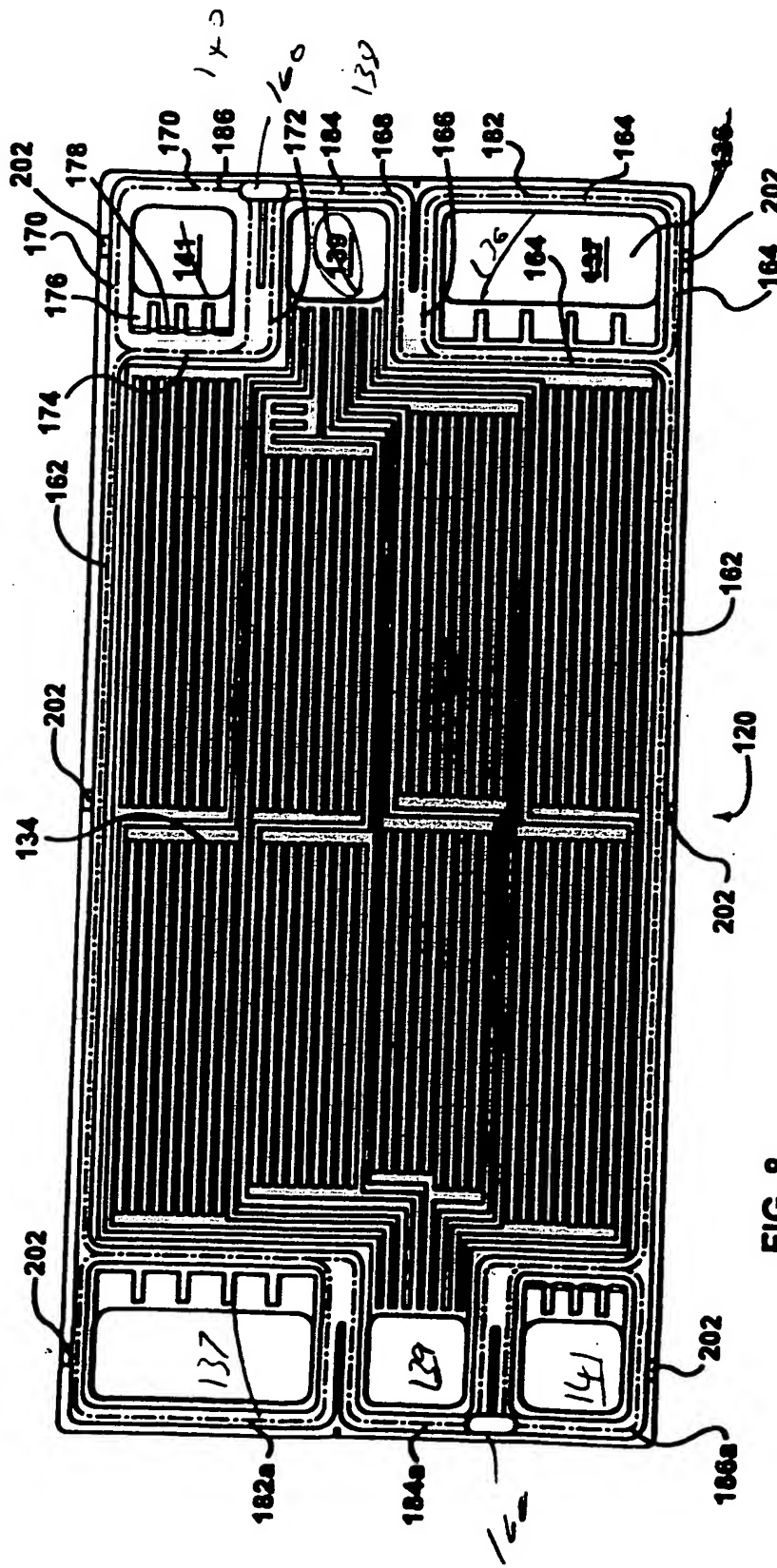


FIG. 7

Annotated Sheet Showing Changes



*rotational head bin axis.
well and*

FIG. 8

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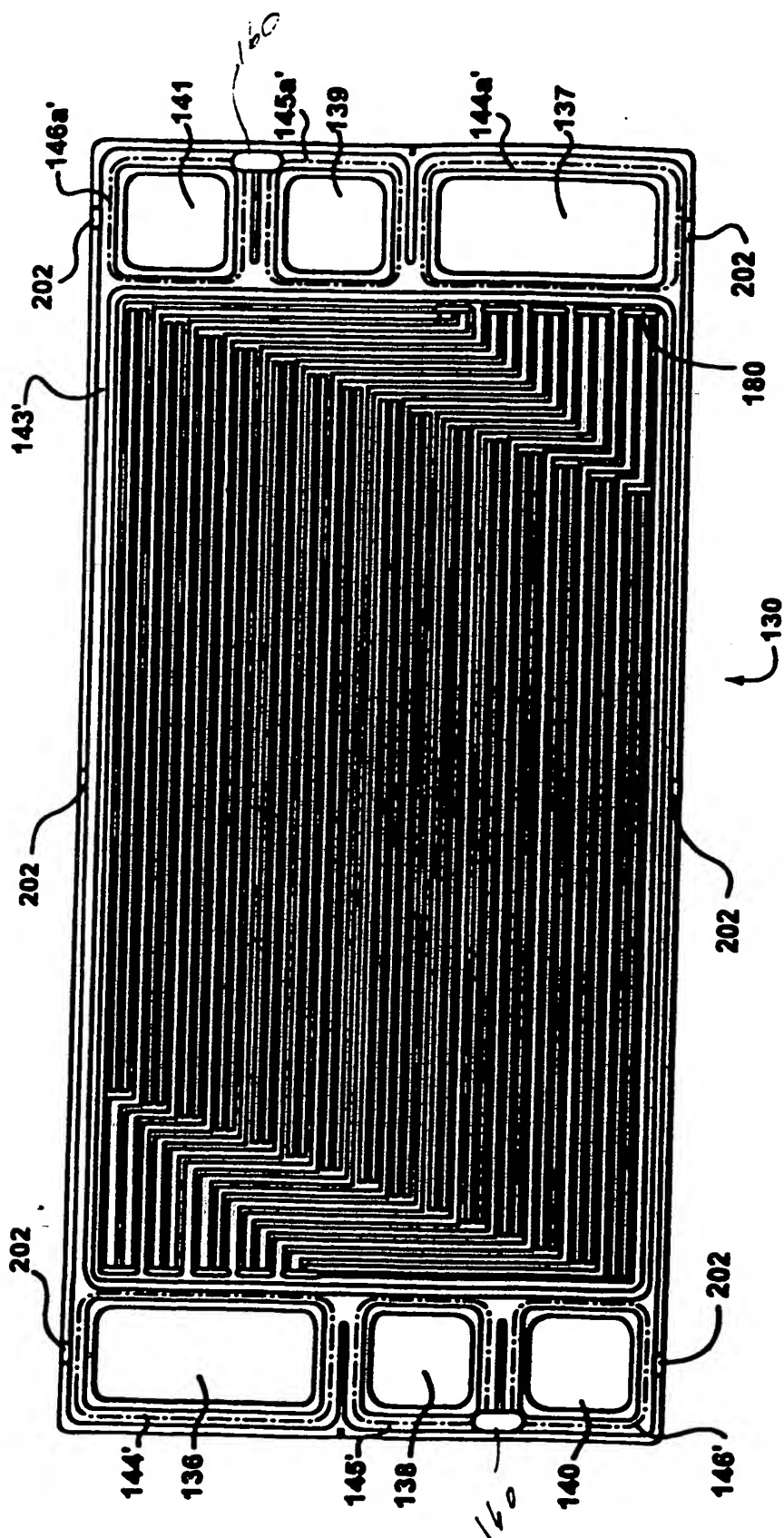


FIG. 9

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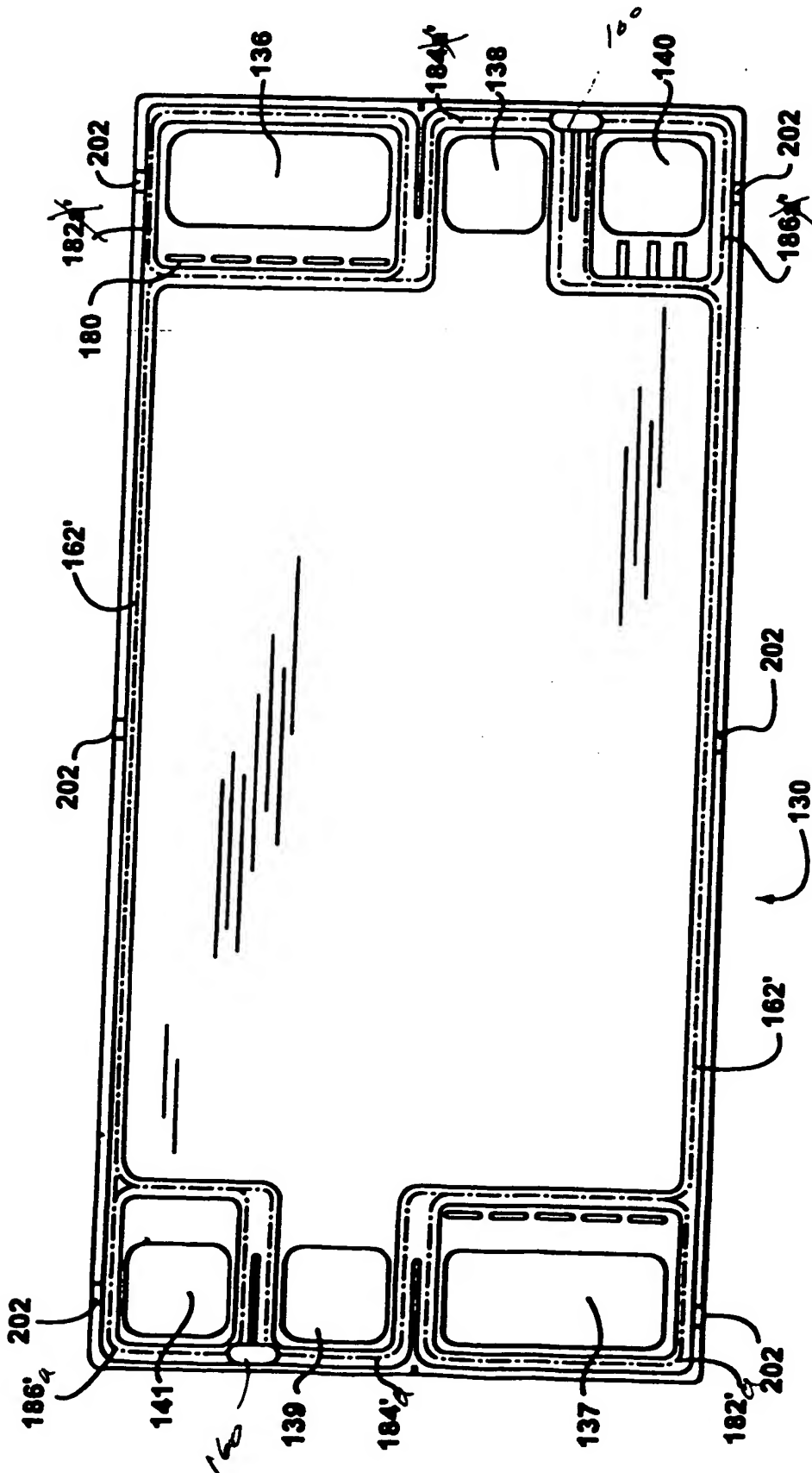


FIG. 10

Annotated Sheet Showing Changes

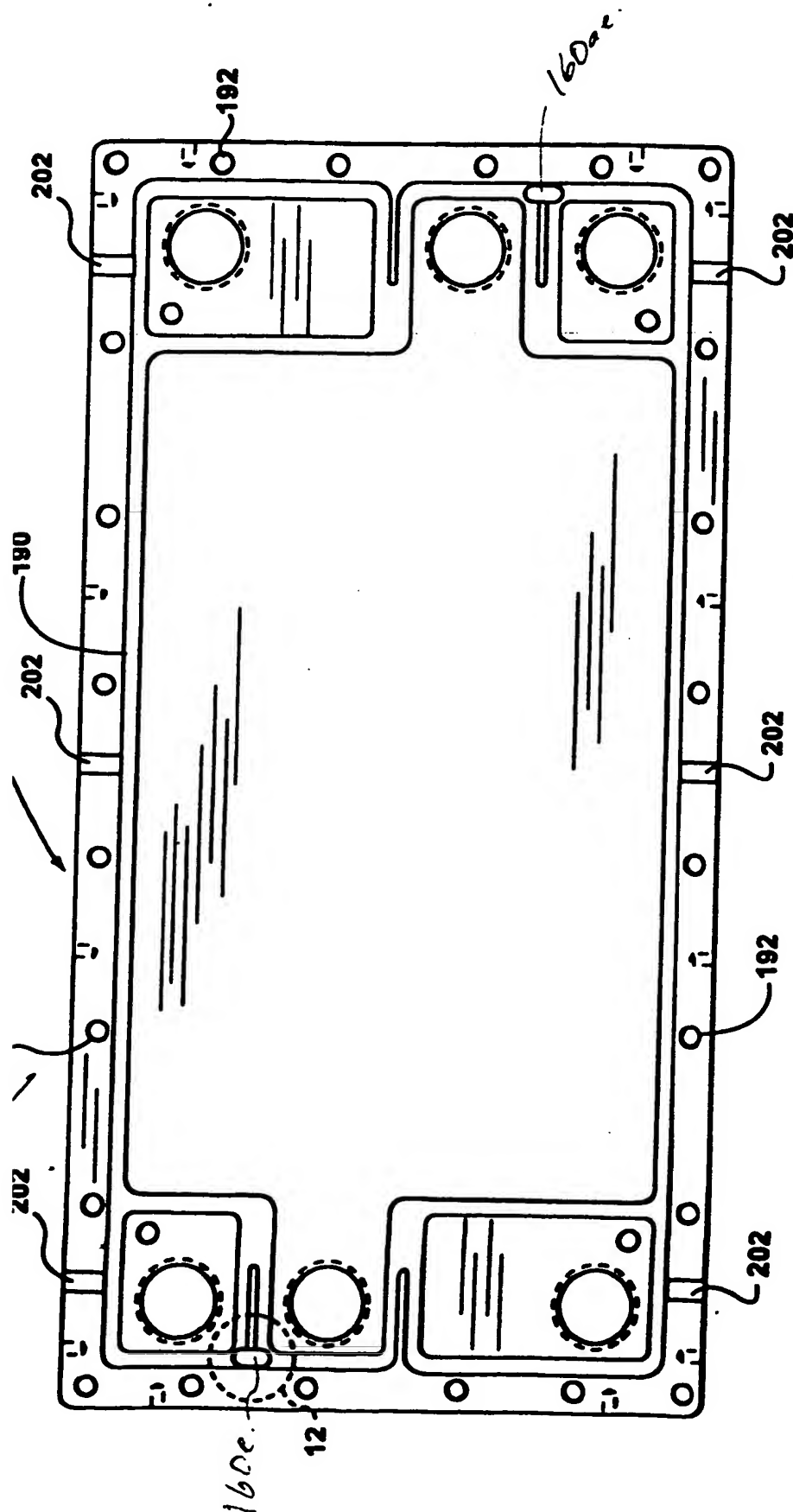
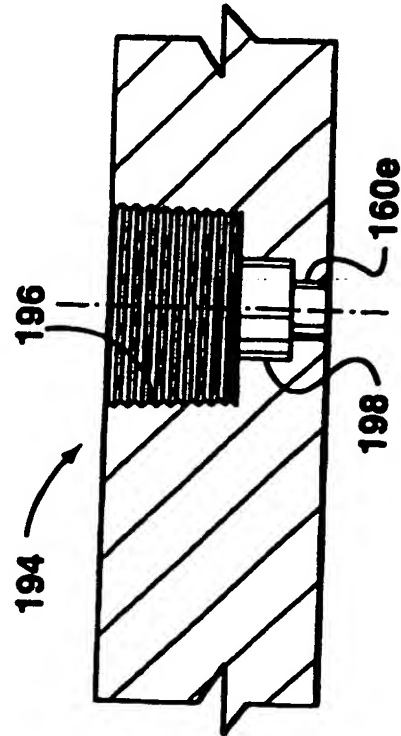
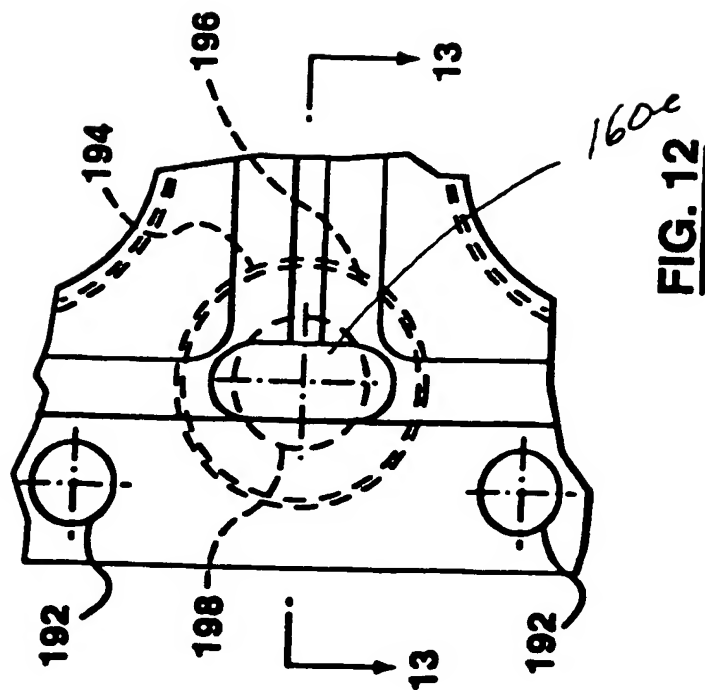


FIG. 11

Annotated Sheet Showing Changes



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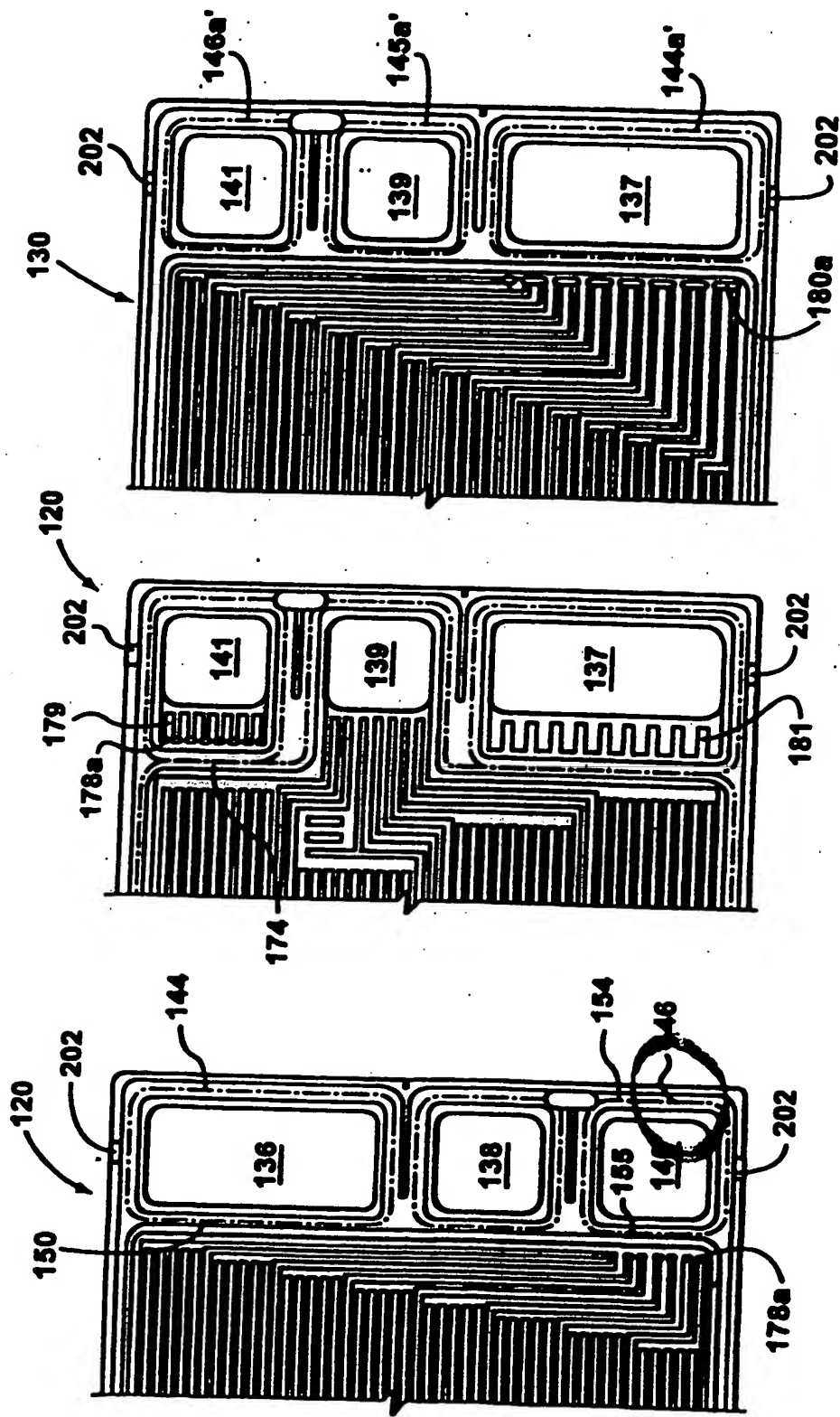


FIG. 17

FIG. 18

FIG. 19